

WORKSHEET # IV

1. Find an equation of the line tangent to the curve

$$(x^2 + 1)y + \frac{1}{\pi} \sin(\pi(y + \sqrt{x})) = 2$$

at the point $(1, 1)$.

2. Use implicit differentiation to find dy/dx for the following:

a) $x + \sin y = xy$

b) $y^2 \cos \frac{1}{y} = 2x + 2y$

c) $2xy + y^2 = x + y$

3. Find equations of vertical tangents to the graph of the equation $\operatorname{cosec}(x^2 + y^2) = 1$.

4. Find the value of $\frac{d^2y}{dx^2}$ for the following function at the given point $(0, 1)$.

$$xy + y^2 = 1$$

5. Find all the points on the following curve which have slope -1

$$x^2y^2 + xy = 2$$

6. Assuming that the following equations define a parametrized curve giving x and y implicitly as differentiable functions of t , find the slope of the curve at the given value and write the tangent line at the given value.

a) $x = \sqrt{5 - \sqrt{t}}$, $y(t - 1) = \ln y$, $t = 1$

b) $x \sin t + \sqrt{x} = t$, $t \sin t - 2t = y$, $t = \pi$.